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EDITORIAL DEPARTMENT

The two articles in this issue of the *Bulletin* deal with two aspects of the fixed asset problem—the control of capital expenditures and detailed accounting for fixed assets and depreciation. In cost control work today, the industrial accountant is primarily concerned with seeing that variable costs are kept in line with volume. Probably not as much consideration has been given to the control of fixed costs—which can be controlled only at the time the decision is made which results in the recurring fixed charge. Today with the increased current demand for productive capacity and the uncertainty regarding the long-term need for such capacity, the industrial accountant has greater opportunities than ever before to help control the fixed costs arising from capital expenditures. At the same time with the present higher tax rate, with equipment used overtime, and with the many problems arising from the amortization provision of the Second Revenue Act of 1940, it behooves the accountant to see that his fixed asset accounts are in order and in sufficient detail to answer the difficult questions which are going to be asked in the next few years.

The author of our first article is John W. Watson, who has been with the Shell Oil Co., in St. Louis, for the last ten years. During this period he has served as Assistant Controller, Controller, and more recently as Vice President and Treasurer. Prior to his association with the Shell Oil Company, Mr. Watson spent thirteen years in public accounting with Price, Waterhouse & Co. in San Francisco, and Peat, Marwick, Mitchell & Co. in Western Canada.

T. A. Selogie, the author of our second paper, is a graduate of Northwestern University. His early accounting experience was gained with the Club Aluminum Co., where he started in the Inventory Control Department. With Ditto, Inc., since 1933, Mr. Selogie has had charge of fixed asset accounting and statement preparation and is at present serving as Auditor of the Paper and Printing Division. He is an Associate Director of the Chicago Chapter.

Articles published in the *Bulletin* present many different viewpoints. In publishing them the Association is not sponsoring the views expressed, but is endeavoring to provide for its members material which will be helpful and stimulating. Constructive comments are welcomed and will be published in the Forum Section of the *Bulletin*.

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OCTOBER 15, 1941

BUDGETARY CAPITAL EXPENDITURES FOR AN OIL COMPANY

By John W. Watson, Vice President and Treasurer,
Shell Oil Company, Inc., St. Louis, Mo.

CAPITAL expenditures are particularly susceptible to budgetary control. While some projects are considered necessary to maintain a competitive position and others obligatory for other reasons, many may be justified on the basis of the repayment of the invested dollar plus the contemplated earnings thereon. The outlays and income can be forecast with a fair degree of accuracy; hence, those projects which are urged on a basis of profitability can be marshalled in the order of the return to be expected, and, if need be, the less profitable may be postponed or cancelled without perceptible effect upon the results of operations. It is in respect to this type of expenditure, i.e., the profitability type, that I feel that the accountant can render the greatest service to management.

Operating Divisions

I shall discuss this subject from the viewpoint of the integrated oil company, discussing separately the five divisions into which, in my opinion, the operations of an integrated oil company naturally fall. The operations within these divisions are usually, and in our case, are actually, performed by separate departments with competent executives who, with the help of staffs of skilled technicians, present proposals to the management for capital expenditures in connection with the departments' operations, which they recommend according to necessity, desirability, or profitability. The five divisions, the activities of which I shall explain briefly as I proceed, are exploration, exploitation, transportation, manufacture and marketing.

Exploration

The activities of the exploration department include the geological and geophysical surveys of the terrain where it is considered there is a possibility of oil-bearing formations, the contacting of the owners of the mineral rights in such promising prospects so developed, and the leasing of the land for the purposes of exploitation. Because the aim of the people employed in these activities is

to increase the corporation's holdings of underground oil resources or oil reserves, as they are called, the reserves so found might well be charged with the cost of these activities. Due to the speculative nature of the activities, however, and possibly also because only a small part of the exploration costs can be directly identified with the oil reserves at a particular point, it is the practice, although not the general one, to charge to operation the expense of the exploration and land departments. These are the charges to which I previously have referred as "exploratory expenses." They are not considered in the capital budget. However, as a result of exploring, promising tracts of land are found, and in obtaining drilling and production rights there are costs of leases or bonuses to land owners, the purchase price of leases obtained from prior lessees, and sometimes the price paid for oil lands bought outright, all of which are capitalized. If production is developed, these capitalized costs are amortized, through depletion, usually on a unit of production basis. Such expenditures, then, must, with the assistance of the geologists, be forecast for the capital budget. Payments for leases are largely a matter of "horse trading." It is difficult to foretell the result of a particular "deal," but from past experience it is possible to foretell what the total payments of this type, in connection with a particular program, will amount to with at least acceptable accuracy.

Costs of Exploration

The old axiom is that "oil is where you find it." The actual presence of petroleum can be proved conclusively only by drilling. Therefore, having established that the indications are favorable, and having acquired the necessary leases at a given location, the next step is to prove or disprove the existence of oil. Where another company is active in the neighborhood, we may pool our leases with theirs and leave the development in their hands, or we may contribute cash or some of the leases we hold to that company in order to encourage them to drill a test well. Or we may drill ourselves. In the last-mentioned case, the exploration staff will work with the exploitation department to arrange for drilling the well.

If the decision is to leave the development to another company, we may be required to contribute capital for drilling, and these

costs, as well as any of our own drilling costs, are capitalized. The cost of all of the drilling of all types contemplated must be forecast for the budget period. However, the exploration department is seldom concerned with profitability calculations. Those projects in which they are primarily interested are quite speculative in the individual case—the so-called "wildcat" largely—and, like exploratory expenses, the advice of experts is the best guide to the desirability of such expenditures, their amount being limited only by policy or available cash. When an area is tested by drilling one or more wells to the satisfaction of the company, it either remains unproven, in which case the leases probably will be surrendered and the costs written off against the general revenues of the current period, or, the existence of oil under the surface being proven, exploitation will begin.

Exploitation

The function of the exploitation, or production department as it is commonly known, is the drilling and operation of oil wells. Express or implied covenants in oil and gas leases require the drilling of "offset" wells on adjoining properties when producing wells are "brought in" close to the lease boundaries. Thus, in many cases it is obligatory upon the company to drill. Having proven an area by drilling, there are, of course, many wells drilled for the additional production expected. The production (or exploitation) department must then forecast for budget needs the number of wells they expect to drill in each region and, from their knowledge of the geological formations and the costs of drilling through each type of formation, the expenditures they expect to make for such drilling. Also, they are required to predict the expenditure for field lines, tanks, pumps, and the like, necessary for operation of the wells. Payout or profitability calculations are required for wells, even when drilling is obligatory, as a guide to the management in the apportioning of funds.

Calculating "Payout"

A few words may not be amiss as to what, in this case, a "payout" is. In the case of wells, payout calculations comprise estimated values of oils to be produced per month at the prices the company posts in each area as the price they will pay royalty

owners or other producers for their share of production and the estimated cash costs of operating the wells. Since posted prices are competitive throughout the nation and, as a general rule, the larger refining companies are buying some part of their crude requirements at approximately these prices, they can be considered to represent with fair accuracy the value of the oils to the company. Having determined in this way the value of production expected per month (this is simplified in most states by proration regulations designed to keep actual production at a stated figure substantially below the possible maximum), and having estimated the direct operating expenses (excluding depreciation and depletion but allowing for a risk factor), the calculation is completed by expressing in terms of months the time it will take for the excess value of the oil over expenses to pay the costs of drilling—called the payout time. For example, a well may be said to pay out in fourteen months, which means that the value of the oil produced in fourteen months is equal to all capital costs and running expenses for that period.

Another activity which is associated with production, because usually conducted in or near the oil fields, is the recovery of "natural" gasoline from the gases trapped at the head of the well casing. Because of the economic need for fairly large scale operation, this frequently is done in partnership or as a joint venture (which I believe is a better term) with other producers. While, due to the reason given, the recovery of natural gasoline is usually associated with production, the technique of the recovery is more akin to refining operations and, in general, what I have to say later about the consideration of manufacturing projects applies to this operation.

Transportation

The next section, or department, is the Transportation Department. As the ideal location for a refinery is one where the supply of crude oil may be moved to, and where the supply of products may be moved from the refinery, in such a way that transportation costs all the way from the well to the product consumer are kept at a minimum, there is no more important phase of the economics of the petroleum industry than that of securing the best possible transportation position available. The crude oil transportation

system from the wells to the refinery is, therefore, an important phase of the industry which is under constant study, and looms large in any planning for the future.

The transportation of crude oil from the field to the refinery is a major part of the operations of the integrated oil company. While some crude oil is transported by rail, in general the lower cost water and pipe line transportation must be used to be able to refine competitively and profitably. As the major part of the nation's crude oil moves through pipe lines, I shall confine my discussion to the transportation of crude oil by pipe lines.

Justifying Pipe Lines

Assuming the existence of a system of refineries and crude lines of ample capacity to serve them, the projects for line construction usually arise in connection with new fields. When production becomes available at locations not already served, either on our own properties or those of others, the pipe line engineers must provide gathering facilities, storage tanks and, usually, trunk line facilities from the gathering tanks to the nearest point at which the existing pipe line system may be tapped. Some very nice problems arise in such cases. The field may be located conveniently so that only a small investment is necessary. We may be able to arrange to sell our production on the site by reciprocal arrangement with another producer who will sell to us at a location more convenient to us and less convenient to him, thus avoiding any investment in pipe lines, or keeping investment to a minimum. It may be more economical to use the facilities of others for the transportation of our oils either all or part of the way to the refinery, paying their tariff rates, or we may be able to join other producers in the vicinity to install a line jointly to serve our separate interests. All these things must be considered before a proposal for a projected new line is submitted.

Forecasting Pipe Line Expenditures

When it is determined that the right solution is the construction of pipe line facilities, the estimating of the costs of rights-of-way, pipes, pumps and equipment, and the costs of installation are an engineering task of no mean proportions. The project as submitted to the management must show that the pipe line it proposes to con-

struct is the most economical facility for disposing of the production as well as the estimated cost. Generally speaking, therefore, it is impossible to forecast for a year what new pipe lines will be needed specifically, and this is a matter of current importance as the need arises. However, as efforts constantly are devoted to the acquisition of new production, partly to replace the exhaustion of oil reserves and partly to improve the ratio of own produced crude to purchased crude, it may be foreseen that new connections will be necessary from time to time at fairly regular intervals. So, from our experience in prior years, it is possible to forecast roughly the amount of construction which will be done, and to make appropriations.

Replacements of line sections sometimes are necessary, of course. The necessity for ordinary replacements can be foreseen and no problems of right-of-way costs and the like are involved. It is only necessary to estimate costs of pipe, equipment and installation.

Manufacturing

A large, modern refinery is a very complex plant. As refineries usually are located outside of population centers, they must provide many types of assets which are not necessary to an industrial plant located in a city. There are units for distilling and cracking oils and auxiliary units for further processing the outturn of those units. There are utility units such as boiler houses, electric systems and water works to provide water for steam, for condensing vapors by cooling, and for domestic purposes. There are dwelling houses and employees' clubs, which in some instances even include golf courses, and in many instances tennis courts, swimming pools, recreation rooms and picture shows.

The science of refining is always advancing. Methods are being improved and new products developed by research, whereupon new or improved processes to make them are designed. Under such conditions, obsolescence, in so far as processing units are concerned, is usually accruing at a faster rate than physical depreciation. It will be clear, therefore, that when a new project is proposed on the basis that the existing processing plant is obsolete, some involved calculations of comparative profitabilities are to be expected.

The entry into and development of new markets, or an increased

demand from older markets, as well as the introduction of new products, may call for enlargements of the refinery, and these must be justified by profitability.

The Marginal Principle in Calculating Payout

The "marginal" principle is often followed in calculating payout profitabilities for refineries. When the raw material is crude oil and the project is an extension or enlargement of capacity, crude which costs the most delivered will be considered as the raw material needed, on the principle that as much as practical of the lower-cost crudes already are obtained, which is usually the fact, and any additional supplies of raw material must be purchased at the higher cost. Fixed expenses generally should be ignored and an attempt is made to arrive at the actual addition to operating expense which will be caused by the extension. In the fixing of estimated prices for products, usually the lowest market prices should be used, even when the cause of the addition is the need to supply a new market yielding higher prices, because the diversion of products from the less profitable markets is a possible alternative source of supply to meet the new demand. If the raw material for an extension is a refined product, the price to be realized from the next most profitable sale should be considered as the cost of the material to the projected unit. Another consideration not to be overlooked is that the capacity to produce the products may be available at another refinery, and products from there can possibly be shipped into the marginal territory between the two at a freight differential so low that when the fixed costs are eliminated from those products, no payout—or only a very long one—can be calculated on the plant extension under consideration.

Justifying Replacements

Where the project is a replacement, no calculation of profitability is necessary when the old plant is worn out, but if obsolescence is the chief factor, the determining consideration usually is reduced expense, in which case only the expense of the new project need be estimated for comparison with the actual expense of the unit it is proposed to replace. In some cases, obsolescence is the result of possible improvement in the quality of the product, but, as a

rule, this improvement will not result in additional income, as products are constantly being improved without increasing the price to the consumer. Thus, projects of this type usually are recommended as necessary or desirable to keep or improve our competitive position and not necessarily because of profitability.

Naturally, there are exceptions to all of the rules I have stated. The study of each project follows the lines indicated by the particular attendant circumstances. However, it is true that when a project is justified on a profitability basis, an attempt is made to free the calculation from all considerations not directly affecting the net cash return. For instance, while the losses on retirement of old plants may be noted, they are not charged against the profitability of a new project, as, in theory at least, they are chargeable against the old plant and should have been foreseen when it was justified. This attitude tends at any rate to promote progress in keeping plants modern and has some economic significance, as more persons are employed directly on construction and more equipment is used than would otherwise be the case.

Marketing

Under the heading of "marketing" we are concerned only with domestic marketing, as export business requires relatively little investment, deliveries being made directly from strategically located refineries. Domestic marketing involves bulk sales in tank cars to resellers and the larger consumers, and sales through bulk storage depots or terminals to dealers and small lot consumers. Both types of sales contemplate investments also in transportation facilities to serve all classes of buyers, in storage depots from which to serve the dealer and small-lot consumer, and in service stations to serve the truck and car owner. Incidentally, while practically all service stations are now operated by independent dealers, the oil companies still find it necessary to own or lease them and lease them out to dealers.

In the marketing department many projects are justified as necessary to maintain competitive position. Stations *must* be modernized to keep pace with others in appearance and efficiency. We *must* maintain representation along main-travelled highways to serve consumers of our products.

Territorial Considerations

There are, of course, projects which are justified on a basis of profitability, and this begins with the territory to be served. If it be a fairly large territory with large potential volumes of demand, the territory must be surveyed to determine if sufficient revenues to justify an investment can reasonably be expected. The costs of supplying the necessary products must be considered, which will be greatly influenced by the location of the nearest refinery and the transportation facilities now available. In this connection, we must study the position of our competitors as well as our own. In view of the keen competition, almost ruthless in fact, we cannot afford *not* to be competitive.

If, however, it is found that the general situation is satisfactory, we must look also to the source from which the material is to be made available. Have we any unused refinery capacity? If so, the marginal cost only of additional production should be considered. If not, can the products be made available from less profitable territories? If so, the present return or the marginal cost, whichever is the higher, is the proper price to charge for products. If neither, then a refinery extension must be considered. Thus the refinery and marketing extensions become a single project to be considered together.

If our position in the territory is unsatisfactory, the question as to whether it can be made satisfactory becomes pertinent. This is, primarily, a question of transportation facilities. Perhaps we can deliver more economically by truck than by rail. Perhaps water transportation can be utilized by investment in terminal facilities on navigable water. It may be that a product pipe line is indicated as the only practical solution. In an extreme case, a new refinery might be considered. In any event, investments in a territory where we are not competitive are kept at the minimum usually to permit representation only.

Selecting from Alternatives

When satisfied that the territory is such as to merit investment, we must consider the type of unit or units to be built. Perhaps we can find that it is most economical to enter the territory through a jobber who has or will acquire his own storage facilities and outlets. In this case, some assistance by way of a line of credit or

even a capital loan may be necessary. Protection from subnormal price conditions or advice on management may also be necessary. Or perhaps we should erect a depot or group of depots with a key depot to which products can be shipped in bulk for rehandling and delivery to smaller depots. The relative merits of all such possibilities would be weighed very carefully before the full project is submitted. We must also consider the question of outlets. We may find existing dealers to whom our brand and service can be sold. Generally, however, to secure representation we are compelled by competitive conditions to make some investment in retail outlets, which will be leased to dealers to market our products to the motorist, as it will be found that most of the better type of outlets will already be held by other large companies.

When all these and such other questions as may arise have been given consideration, a project is in readiness for presentation. It should be accompanied by an outline of investigations made, a payout calculation prepared on the "marginal" principle already discussed, as well as a computation showing the estimated returns, assuming that the management of the area under consideration were to buy the products at wholesale and operate as a separate entity.

Approval of the Budget

When the projects from the several departments are finally assembled for inclusion in the budget, they are not always in such shape as to permit the management, then and there, to decide whether to make the investment. The departments classify the various projects they submit as:

1. Essential.
2. Profitable, with further classification as to the time required for the estimated cash surplus from the operation to pay out the investment.
3. Desirable.
4. Replacements (where physical life is exhausted).

The management will examine the reasons for the classifications and the merits of the projects in so far as is practical in consideration of their preliminary form, marshaling those classified as

profitable in the order of the degree of profitability, and will provide appropriations for those selected as meritorious.

Relating Total Appropriations to Write-Offs

In making appropriations, the principal yardstick by which the management measures the total of all appropriations, and, in a more limited way, the total that will be allocated to each department, is the total forecast of "writings-offs" to be charged to operations. In cases of major expansion, of course, it is obvious that such a limitation would not necessarily apply. The reasoning for this "yardstick" approach to the question will, however, be clear when it is remembered that "writings-offs" are represented by cash from operations which has been "reserved" or withheld from distribution as dividends, and is or ought to be available for investment in plants or in plant rehabilitation. Generally, some margin between total capital expenditures and total writings-offs will be allowed for, because if profits are to be paid out as dividends, capital expenditures in amounts beyond the reserved sums will tend to encroach upon working capital, in which case new financing might be necessary. While, of course, it will on occasion be necessary to go beyond this limitation in making capital investments, such a decision is an extraordinary one and would be dealt with on its merits.

Controlling Actual Expenditures

Following the approval of the budget by the Board of Directors, each item is identified with a specific appropriation number, and as the final study on each project is completed and, in turn, approved by the departmental and the general management, it is recorded as a commitment against the budget. The uncommitted balances of the appropriations are held in abeyance pending the submission of specific recommendations and, failing this, are dropped unless projects on which work is to be undertaken during the budget period are still under serious consideration. In such cases, the appropriations are carried forward into the ensuing period as committed, and become, in effect, a part of the budget for that period.

The capital budget is under constant review, and additions and cancellations are reported to the Board of Directors each month,

thereby reflecting the up-to-the-minute status of the year's capital projects.

A brief reference to the system of numbering may be of interest. Two series of numbers are maintained for each department —one for appropriations and one for commitments. The appropriation serial numbers are prefixed by a one-digit numerical departmental symbol, and the commitment serial numbers by a letter departmental symbol, thus facilitating distribution between appropriation and commitment numbers. The appropriation numbers are assigned when the budget is approved. As specific projects are submitted and approved, a commitment number is assigned. The appropriation numbers are used in the capital expenditure reports and correspondence to identify the item readily.

Reports

Each month a capital expenditure statement is prepared to show the current status of the appropriations and the commitments, and the capital expenditures thereagainst. The capital expenditures reported must, of course, agree with the change in the fixed assets as it appears on the balance sheet, after taking into account retirements and other adjustments.

When a project is finished, a completion report is submitted showing a comparison of estimated and actual expenditures. Over-expenditures reduce the total uncommitted appropriations for the department, and under-expenditures are added back to the uncommitted appropriation total. At the year-end the completed projects are dropped from the budget and the net unexpended amount of commitments on which work is still under way is carried forward to the budget for the following year, being recorded separately from new appropriations in the following year. The total of both current and carried-forward amounts, less the estimated amounts to be carried forward at the end of the period, are carried into the consolidated budget as the forecast of capital expenditures and together are kept within the limits of the estimated writings-off.

Estimating Cash Requirements

All proposals submitted for final approval disclose the estimated "new cash" expenditure, the value of material which can be used from salvaged second-hand stocks, and surplus machinery and

equipment that is available from units already capitalized in the fixed asset classification of accounts. Retirement costs and retirement loss or gain (if any) are also noted where replacements are involved. The estimated "new cash" expenditure is the principal consideration of the management in approving commitments. Salvaged material stocks are usually large and uses therefor generally few, and they have only small resale value. Materials used from the capital accounts are merely transferred from the accounts where formerly charged to the new account, and, although recorded, are not considered as expenditures against the new commitment. The retirement losses represent a cost already incurred, and, as the effect of the retirement is to bring into the current period writings-off which otherwise would be spread over several accounting periods, the notice serves to advise the management of the current effect on the operating results.

And now a word regarding the delegation of authority to members of the management to approve the projects contained in the budget. As previously mentioned, the appropriations in total are first approved by the Board of Directors. As these appropriations apply to particular departmental groups, each under the management of a vice president, the latter is given authority within certain limits to pass final approval, thereby confining the approval of the president to the larger items or those peculiarly affected by changing conditions. The vice presidents are also permitted to delegate some of their authorities to make definite commitments to their department managers, also with certain limitations.

Conclusion

The capital budget should be co-related with a long-term plan. Having been approved, the budget should be a tool for management control of expenditures and a program against which to measure accomplishment. To serve these purposes, any budgeting system must provide for the measurement of actual accomplishments against the budgeted figures both during and after the budget period. The actual profitability of capital expenditures, justified on a basis of profitability, should be tested at the end of the estimated payout periods to determine if the forecasted results have actually been obtained, and here the accountant can also be of great help to the management. Such a system of comparisons will

tend to produce the care and interest on the part of estimators which is necessary unless the budget itself is to be permitted to become a meaningless formality. From a study of the mistakes which have occurred in budgeting, better forecasting methods should result. Constant study of forecasting methods is necessary to keep estimates accurate under changing conditions and to insure the constantly increasing accuracy necessary to bring budgeting to the point of fullest utility.

A CASE STUDY OF ACCOUNTING FOR FIXED ASSETS

By T. A. Selogie, Auditor, Paper & Printing Division, Ditto, Inc., Chicago, Ill.

OUR Company, like many others, was not particularly concerned about accounting for fixed assets through any detailed record, until the treasury department issued T. D. 4422 in February 1934. Although this document is now seven years old, you will recall that one of its most important rulings was, "The burden of proof will rest upon the taxpayer to sustain the deduction claimed for depreciation." In other words, the burden of proof has been shifted from the government to the taxpayer.

Mimeograph 4170, issued by the Commissioner of Internal Revenue in connection with T. D. 4422, indicated the information that would be asked of the taxpayer in support of his depreciation claim. This new information and proof of depreciation claim presented many problems in our organization which had to be settled. In this paper I will point out the major problems which confronted us, how we solved them, and the general mechanics of installing an accurate record of the investment in fixed assets, together with the accounting for depreciation.

Problems Involved

To provide our company with a suitable record for accounting for fixed assets, we had these major problems to solve:

1. Preparation of an analysis of all fixed asset accounts to date.
2. Taking a physical inventory of all fixed assets in our plants.
3. Determination of the physical condition of equipment in the plants.
4. Revision of asset accounts in our general books, giving proper effect to plant, department, burden center and description of assets, thus enabling us to use this classification in accounting to the management and government.
5. Determination of system to be used in accounting for fixed assets and depreciation in relationship to the requirements of

our accounting and cost departments, keeping in mind the cost involved in maintaining such a record.

6. The reconciliation of the physical assets and reserves with the general books.

After presenting the above problems to management and giving them an idea as to the approximate expense involved in their solution, we were given the proper authority to proceed.

Analyses of Fixed Asset Account

A careful analysis was made of all fixed asset accounts on the books from the time of incorporation to date. To accomplish this we headed up worksheets for each general ledger account as illustrated by Exhibit 1. From this analysis we were able to determine the contents of our general accounts. It gave us a starting point for reclassifying all the equipment into a revised asset record. Equipment had been transferred from department to department with no corresponding transfer being made on the general books of the company. Therefore with this analysis we were in a position to charge each department with the exact equipment they had on hand after tying it in with the physical inventory. The history of each asset account was analyzed in an intelligent way, so that we had no difficulty using this history as the basis of our permanent and tabulating record, which will be described later.

The Physical Inventory

The taking of a physical inventory involved the engagement of an outside firm. Their representative, together with our department heads, served as the staff for taking inventory of the items in each department. We secured the services of an outside firm because we felt that it would give us an unbiased inventory. At the time the work involved did not permit the use of any member of our staff. The difficulty encountered in taking inventory of special and complicated machinery required the services of the department head, who was thoroughly familiar with the use, description and minute detail regarding each unit.

As the equipment was being inventoried, an inventory number was placed in a location where it would be most visible and at the

EXHIBIT 1

ANALYSIS OF FIXED ASSETS

GENERAL OFFICE FURNITURE AND FIXTURES

Year 1934

Acct. 144-1

Month	Reference	Purchased From	Particulars	Purchased For	Amount
Jan.	Vo. 1040	Royal Typewriter Co.	1—12" Royal Typewriter #12666	Miss E. Jones	$ 95.00
"	J. E. 122	Machine Shop Production	1—Steel Table 16 x 20"	Mail Dept.	25.00
			Total addition for Jan.		$120.00
Feb.	Vo. 2364	Sunstrand Add. Co.	1—Electric Adding Machine #959587	Mr. Brown	$350.00
Dec.	Vo. 12345	William Mfg. Co.	1—Swivel Chair	Mr. Phillips	15.00
			Total Additions for year		$485.00

same time receive the least wear. A decalcomania stamped with the equipment inventory number was used on such items.

On equipment which required considerable handling or where it was difficult to place the decalcomania, we used an electric needle to burn in the inventory number. Each type of equipment had a specific location for affixing the inventory numbers.

After locating and tagging the equipment it was then itemized on the inventory sheet as illustrated in Exhibit 2. In this respect all pertinent information, such as manufacturer's name, serial number, model number, special attachments or equipment, etc., were noted to assist in identifying the purchase and in pricing the inventory.

Classification as to Physical Condition

The classification of each piece of equipment as to its physical condition was left to the discretion of the outside representative and the department head. To indicate the decision that they arrived at, they would use the following words:

1. Good—U. (This meant that the equipment was in excellent condition and was used in production.)
2. Good—O. (This meant that the equipment was obsolete and not used in production.)
3. Good—I. (This meant that the equipment was idle, and at present not being used in production.)
4. Poor—O. (Obsolete, but still being used in production.)
5. Poor—W. (Worn out and needs replacement.)
6. Bad —S. (Should be scrapped.)

By having this information for each piece of equipment it was possible to determine the necessary replacements, and to arrange for the scrapping of such equipment as had outlived its useful life. If nothing more, a good inventory, together with a report on the physical condition of each item should rid any organization of many items that are no longer needed.

Revision of Asset Classifications

In the revision of our classification of accounts we had in mind the problem of assigning the account numbers in such a manner as to make it possible to sort items and accumulate the totals from

EXHIBIT 2

INVENTORY—FIXED ASSETS

Building—1 Acct. No. 144-1

Floor—2 Date 12-31-34

Dept.—General Office

Invty. No.	*Quantity*	*Kind of Equipment*	*Used by*	*Condition*
1-102	1	12" Royal Typewriter #12666	Miss E. Jones	Good—U
1-103	1	Steel Table 16 x 20"	Mail Dept.	" "
1-104	1	Electric Sundstrand Adding Machine #959587	Mr. Brown	" "
1-105	1	Swivel Chair	H. Phillips	" "

Signed:—

Supervisor of Invty._____

Department Head_____

punched card tabulating records, which will be described in detail later. Exhibit 3 shows the classification that was worked out to accomplish this result. You will find in this exhibit that the first

EXHIBIT 3
REVISED CLASSIFICATION OF ACCOUNTS
Jan. 1, 1935

Asset Acct.	*Reserve Account*	*Particulars*
140	—	Land.
141-1	241-1	Building—Plant 1.
-2	-2	" — " 2.
142-1	242-1	Building Improvements—Plant 1.
-2	-2	" " — " 2.
143-1	243-1	Building Equipment — " 1.
-2	-2	" " — " 2.
-3	-3	" " —Maintenance Dept.
144-1	244-1	Furniture and Fixtures—General Office.
-2	-2	" " " —Branch Offices.
-3	-3	" " " —Eastern Whse.
145	245	Laboratory Equipment.
146-1	246-1	Shipping Equipment—Cincinnati Whse.
-2	-2	" " —Chicago Whse.
-3	-3	" " —Eastern Whse.
147	247	Stores Department—Equipment.
148	248	Testing Department—Equipment.
151	251	Mfg. Dept. A—Processing Equipment.
152	252	" " "—Machinery and Equipment.
153	253	" " "—Sundries Mfg. Mach. & Equip.
154	254	" " "—Furniture & Fixtures.
161	261	Mfg. Dept. B—Machinery.
162	262	" " "—Bench, Rack and Handling.
163	263	" " "—Model Equipment.
164	264	" " "—Furniture & Fixtures.
171	271	Mfg. Dept. C—Machinery.
172	272	" " "—Auxiliary Equipment.
174	274	" " "—Furniture & Fixtures.
181	281	Mfg. Dept. D—Machinery & Equipment.
184	284	" " "—Furniture & Fixtures.
191	291	Mfg. Dept. E—Presses.
192	292	" " "—Composing Equipment.
193	293	" " "—Bindery Equipment.
194	294	" " "—Furniture & Fixtures.

digit under the asset account column is 1. This is the major control for sorting all assets to get their total valuation. The second digit under this column—namely 4, 5, 6, 7, 8 and 9—indicates the department in which the equipment is located. The third digit is for the major burden centers within the departments.

In certain production departments we found it necessary to break down our depreciation charges to give proper distribution to the various minor burden centers. This was due in a large part

to the type of equipment used in each minor burden center, and its rate of depreciation. This accomplished a more accurate spread of the depreciation cost, thus giving our cost department an efficient tool for the allocation of cost of depreciation to each operation. Take, for example, the major classification Acct. 191—Manufacturing Dept. C—Presses; this was broken down as follows:

Acct. 191—	120	Press Room
	—121	Small Cylinder Presses
	—122	Large Cylinder Presses
	—123	Platen Press
	—124	Card Presses
	—125	Special Presses

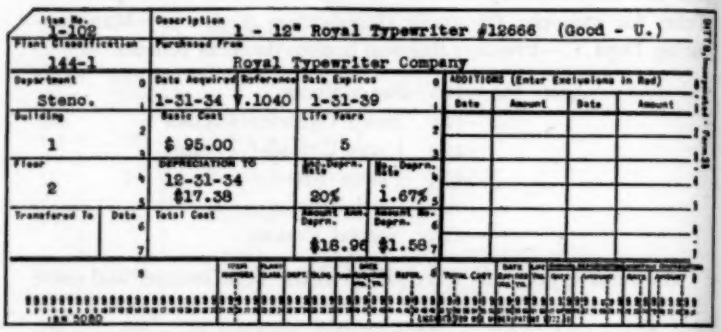
The reserve accounts were set up in the same manner and same detail as the comparable asset account, with the exception of the first digit which is No. 2. This number identifies the reserve in the same manner as No. 1 identifies the asset.

Developing the Accounting System

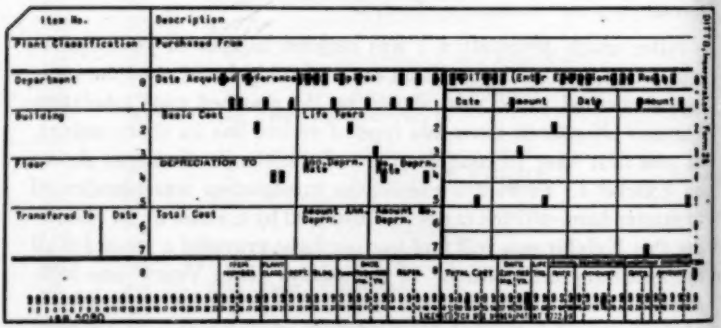
After much deliberation it was decided, in view of our requirements in accruing depreciation on a monthly basis, that the most logical method to be used should be the punched card tabulating system. Of course, even this type of record has its shortcomings, as you first have to compile your information by hand, as shown on Exhibit 1. From this exhibit the information was transferred to master hand-written cards as illustrated by Exhibit 4. In reviewing this Exhibit you will find that we have provided a space for all the necessary information. In the section "Life Years" was indicated whatever number of years was selected as the expected life of the asset, in keeping with good accounting practice and rulings of the Bureau of Internal Revenue. After we had determined the number of years over which we wanted to spread the depreciation charge, we calculated the percentage or dollars per month, based upon the number of months of life expectancy.

On one section of this card we provided for "Depreciation to." This section proved helpful to us in accruing the depreciation on each individual asset item to 12-31-34, at which time we made the necessary adjustment, bringing the asset and reserve accounts in balance with the general books.

This hand record, as illustrated in Exhibit 4, served as our master file. From these master cards, tabulating cards were punched, as illustrated in Exhibit 5. When this had been accom-



HAND WRITTEN TABULATING CARD
EXHIBIT 4



PUNCHED TABULATING CARD
EXHIBIT 5

plished, both sets of cards were filed by account number, and within the account in chronological order. In this way items that became fully depreciated were automatically brought to our attention by being the first items on the tabulating report. An illustration of this tabulating report appears on Exhibit 6.

Each month the tabulating department runs off a listing of the assets and monthly depreciation by major account number, depart-

EXHIBIT 6

TABULATING PLANT EQUIPMENT RECORD

Month of Jan. 31, 1935

Plant Class	Exp. Date	Item No.	Building	Floor	Date Acquired	Life Years	Reference No.	Basic Cost	Monthly Deprec.
144-1	2-28-38	1-104	1	2	2-28-34	4	1-2364	$350.00	$7.29
144-1	1-31-39	1-102	1	2	1-31-34	5	1-1040	95.00	1.58
144-1	1-31-44	1-103	1	2	1-31-34	10	2-122	25.00	.21
144-1	12-31-44	1-105	1	2	12-31-44	10	1-12345	15.00	.13
								*$485.00	*$9.21

Reference Key
1—Vouchers
2—Journal
3—Cash

ment or burden center class, so that when these reports are turned over to the accounting department, they not only tie in with the general books, but also give us the total monthly depreciation accrual to be recorded on the books.

We are all acquainted with the demands made upon us by the Bureau of Internal Revenue to account for total additions for year, items fully depreciated, items traded in, items scrapped, etc. To meet this need we made up a large spread sheet listing the account numbers of the assets along the left margin. On the top, we provided columns as follows:

1. Balance for previous period.
2. Additions for current period.
2. Deductions through sales or other means such as scrapping.
4. Fully depreciated items written off.
5. Balance at end of current period.

A similar schedule was also prepared for the depreciation reserve accounts. We compiled this information each month, so that at the end of the year it was not necessary to do any backtracking. These schedules tied in, not only with the general books, but also with the master file and tabulating summary thereof.

Reconciliation of Physical Assets with Books

The first thing that was done in tying in the physical assets and their respective reserves with the general books was to make up a hand-written tab card on each item in our analysis of fixed assets (Exhibit 1.)

The next step was to identify each of these cards with the equipment listed on the inventory (Exhibit 2).

Three situations were experienced in making this comparison. In the first place items charged on the books to one department were located through the physical inventory as being used in another department. In such instances the asset value was transferred by journal entry from the department charged to the department in possession of the item.

In the second place, certain items were present in the physical inventory which could not be identified with any items charged on the books. In such cases a valuation was set, by agreement between the outside representative, our purchasing agent and the department

head, based upon the condition of the asset, its use, and the market value of similar items in like condition.

The third condition found to exist related to items shown as charges on the books which could not be identified with items physically present. The master cards representing this type of difference were totaled and offset against the totals of the assets present, but not identified against charges on the books, and the asset valuation shown on the books was adjusted by such difference. Thus the resultant asset valuation shown on the books was brought into agreement with the totals of the cards representing the assets present as shown by the physical inventory.

On each master card representing an asset in existence, the accrued depreciation from date of acquisition to December 31, 1934 was computed. The total of all such reserve was then determined by asset classification, and the reserve as shown on the books was adjusted to bring them in agreement with such totals.

On the tabulating cards we accumulated the depreciation to December 31, 1934 on each item. The total of the depreciation and the assets on the general books as of that date was thus brought into agreement with the hand-written tabulating cards (Exhibit 4), which in turn had been reconciled with the physical inventory.

After this was done, the hand-written tabulating card record was turned over to the tabulating department. Tabulating cards were then punched, and the depreciation for the month of January, 1935, was run, as illustrated in Exhibit 6.

I might add that the general books, the tabulating plant equipment record, and the work papers as outlined were in complete agreement at all times.

General Comments

This paper describes a system based on the straight-line method of depreciation; however, with a little alteration it could be applied to other methods.

Due to the ever-increasing government restrictions and regulations, many accountants are inclined to be too strongly influenced by the government—so much so that we lose our sense of sound principles of accounting. In many cases the government will advise you to use certain rates in computing your depreciation which

result in a greater revenue for the government and a smaller depreciation accrual for the taxpayer. If the taxpayer feels that his old plan or rate for computing his depreciation is sound from an accounting and management viewpoint, then by all means these rates should be used for the general books. In computing the depreciation as allowed by the government, a duplicate tabulating record can be maintained with very little extra cost, so that at the end of the year the allowable depreciation will be used in estimating your requirements for Federal income tax purposes.

At the first observation of the system outlined in this paper it might seem to be very laborious and expensive; but I might add that in our company we have one man who is in charge of the plant accounts, and he spends about three days a month in keeping them up-to-date.